

Claims 1-35 are presented for consideration. Claims 1 and 28 are independent. Claims 1, 3, 8, 11, 12, 16-18, 20, 21 and 24-26 have been amended to clarify features of the subject invention, while claims 28-35 have been added to recite additional features of the subject invention. Support for these changes and claims can be found in the original application, as filed. Therefore, no new matter has been added.

Applicants request favorable reconsideration and withdrawal of the objections and rejections set forth in the above-noted Office Action.

The drawings were objected to on formal grounds. The Examiner asserted that the interferometer was not shown in the drawings. This rejection is respectfully traversed. Applicants note that the interferometer is discussed in the subject specification on page 15, beginning at line 16, wherein it is stated that the laser interferometer comprises a laser head 16, a Y-axis measurement mirror 17, an X-axis measurement bar mirror, two left-hand and right-hand axis measurement detectors 19, and two front and rear X-axis measurement detectors 20, for example. These features are shown in the drawings. Therefore, Applicants submit that the features of the interferometer are likewise shown in the drawing. Accordingly, Applicants request reconsideration and withdrawal of the objection to the drawings.

The Examiner objected to the disclosure due to a minor informality. Specifically, the Examiner noted that reference numeral 32 depicted in Figure 4A was not discussed in the specification. Applicants have corrected this informality herein.

The Examiner also objected to minor informalities in claims 8 and 11-27. The claims have been amended in light of the Examiner's comments. Applicants likewise request reconsideration and withdrawal of this objection.

Turning now to the art rejections, claims 1-9 and 11-20 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,271,606 to Hazelton. Claim 10 was rejected under 35 U.S.C. § 103 as being unpatentable over the Hazelton patent in view of U.S. Patent No. 5,858,587 to Yamane et al. Claims 21-27 were rejected under 35 U.S.C. § 103 as being unpatentable over the Hazelton patent in view of U.S. Patent Application Publication No. US2001-0052967 to Ogura et al. Applicants submit that the cited art, whether taken individually or in combination, does not teach many features of the present invention, as previously recited in claims 1-27. Therefore, these rejections are respectfully traversed.

Independent claim 1 recites a moving mechanism that includes a reference structure having a guide surface, a movable portion being movable along the guide surface, and an actuator having movable elements, provided at opposite end portions of the stage, and at least two stators, the stators being separated from each other and each being movable in two-dimensional directions by a reaction force produced as the movable portion is driven.

Applicants submit that the cited art does not teach or suggest such features of the present invention, as recited in independent claim 1.

The Hazelton patent shows a linear-motor driven stage system in which a stator functions as a counter mass to cancel a reaction force in a direction in which a movable portion is driven. In that patent, however, the left and right stators are connected with each other into an integral

structure, and they are not able to move independently of each other. Also, each stator moves only in one direction along the scan direction. Thus, Applicants submit that there is nothing in this document that would teach or suggest utilizing plural stators provided separately from each other, each being movable in two-dimensional directions, as in the present invention recited in independent claim 1.

Applicants submit that the remaining art cited does not cure the deficiencies noted above with respect to independent claim 1.

The Yamane et al. patent shows a stage structure having an X-Y-Z stage with non-contact bearings and θ , Z and tilt stages. The Ogura publication shows a local area network for a semiconductor factory. These citations, however, as with the Hazelton patent, do not teach or suggest the salient features of Applicants' present invention, as recited in independent claim 1.

For the reasons noted above, Applicant submits that the present invention, as recited in independent claim 1, is patentably defined over the cited art.

Dependent claims 2-27 also should be deemed allowable, in their own right, for defining other patentable features of the present invention in addition to those recited in their respective independent claims. Further individual consideration of these dependent claims is requested.

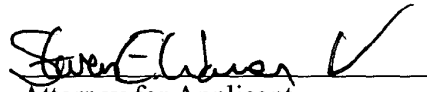
Applicant further submit that the present invention is patentably defined by claims 28-35. Specifically, Applicants submit that the cited art does not teach or suggest the arrangement of the X-Y stage of the present invention recited in that claim, which includes a reference structure, a first movable portion, a first actuator, a second movable portion, a second actuator, and a stage provided at an intersection defined by the first and second movable portions, wherein first stators

of the first actuator and second stators of the second actuator are separated from each other, and each stator is movable in two-dimensional directions by a reaction force produced as an associated movable portion is driven. Accordingly, claims 28-35 likewise should be deemed allowable over the cited art.

Applicant further submits that the instant application is in condition for allowance. Favorable reconsideration, withdrawal of the objections and rejections set forth in the above-noted Office Action and an early Notice of Allowance are requested.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,


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Application No. 09/885,012
Attorney Docket No. 00684.003200.

APPENDIX A

IN THE ABSTRACT

[Discloses is a moving mechanism which includes a reference structure having a guide surface, a movable portion being movable along the guide surface, and an actuator having a movable element disposed at the movable portion side and at least two stators, the stators being separated from each other and being moved by a reaction force produced as the movable portion is driven.]

-- A moving mechanism includes a reference structure having a guide surface, a movable portion being movable along the guide surface, and an actuator having movable elements, provided at opposite end portions of the stage, and at least two stators. The stators are separated from each other and each is movable in two-dimensional directions by a reaction force produced as the movable portion is driven. --

IN THE SPECIFICATION:

Please substitute the paragraph beginning at page 1, line 5, with the following.

-- This invention relates to a moving mechanism suitably usable in a high precision process such as a semiconductor lithographic process, for example, and a stage system having such a mechanism or an exposure apparatus having such a stage system. --

Please substitute the paragraph beginning at page 1, line 10, with the following.

-- The manufacture of semiconductor devices or the like uses an exposure apparatus of a step-and-repeat type (called a stepper) in which a pattern of an original (reticle or mask) is sequentially printed on different exposure regions on a substrate (wafer or glass plate) through a projection optical system while moving the substrate stepwise. An alternative is a step-and-scan type exposure apparatus (called a scanner) in which stepwise motion and scanning exposure are repeated so that the printing exposure is repeated to plural regions on a substrate. Particularly, the step-and-scan type uses a portion of the projection optical system which is relatively close to its optical axis and, therefore, it enables high precision and wide view angle exposure of a fine pattern. --

Please substitute the paragraph beginning at page 2, line 10, with the following.

-- Many proposals have been made to solve such a problem. Examples are U.S. Patent Nos. 5,260,580, 5,684,856 and 6,072,183, showing [a system] systems in which a stator of a linear motor for moving a stage is supported by a floor, independently of a stage base table, thereby to prevent swinging motion of the stage base table due to a reaction force. U.S. Patent No. [5, 172, 160] 5,172,160 shows a system in which, to a machine frame for supporting a

wafer stage and a projection lens, a force actuator for producing a force in a horizontal direction is used to apply a compensating force equivalent to a reaction force caused in response to the stage motion, thereby to reduce the swinging motion of the system by the reaction force. --

Please substitute the paragraph beginning at page 2, line 24, and ending on page 3, line 10, with the following.

-- In these examples, however, although the swinging motion itself of the stage system can be reduced, the reaction force responsive to the stage motion is transmitted directly to the floor or to the floor via a member which can be regarded as being substantially the floor. As a result, the floor is vibrated, which then causes vibration of a peripheral apparatus adjacent to the exposure apparatus. Generally, the floor on which an exposure apparatus is disposed has a natural vibration frequency of about 20 - 40 Hz. If the natural frequency of the floor is excited in response to the operation of the exposure apparatus, it causes large adverse influences to peripheral [equipments] equipment. --

Please substitute the paragraph beginning at page 3, line 11, with the following.

-- The stage acceleration is becoming larger and larger due to increases of the processing speed (throughput). For a step-and-scan type exposure apparatus, for example, the largest acceleration of a stage reaches 4G (for a reticle stage) or 1G (for a wafer stage). Further, the mass of the stage is becoming bulky, due to increases in size of a reticle or a substrate. For these reasons, a driving force that can be defined by "the mass of a moving element" as multiplied by

"the acceleration" becomes very large and, therefore, the reaction force thereof is enormous. Thus, the reaction force becomes large with the increase of acceleration and weight, and vibration of the floor due to the reaction force [can not] cannot be disregarded. --

Please substitute the paragraph beginning at page 4, line 14, with the following.

-- The resolving power of an exposure apparatus can be improved by [changing] making the exposure wavelength shorter or by enlarging the numerical aperture (NA) of a projection optical system. --

Please substitute the paragraph beginning at page 4, line 25, and ending on page 5, line 14, with the following.

-- In relation to deep ultraviolet light, more particularly, ArF excimer lasers having a wavelength near 193 nm or F₂ excimer lasers having a wavelength near 157 nm, it is known that there are plural oxygen (O₂) absorption bands in zones close to these wavelengths. As regards fluorine excimer lasers, for example, because of the short wavelength of 157 nm, the application of it to an exposure apparatus has been attempted. However, the wavelength of 157 nm is in the wavelength region generally called vacuum ultraviolet. In this wavelength region, the absorption of light by oxygen molecules is large and, therefore, the atmosphere does not transmit most of the light. For this reason, it can be applied only in an environment in which the pressure is reduced close to vacuum and the oxygen density is made sufficiently low. --

Please substitute the paragraph beginning at page 5, line 15, with the following.

-- Further, the absorption of light by oxygen results in production of [ozones] ozone (O_3) which in turn [function] functions to strengthen the absorption of light. Therefore, the transmission factor becomes very low. Additionally, various products attributable to the ozone are deposited on the surfaces of optical elements, causing a decrease of the efficiency of the optical system. --

Please substitute the paragraph beginning at page 7, line 18, and ending on page 8, line 3, with the following.

-- It is a further object of the present invention to provide an exposure apparatus which uses ultraviolet light, more particularly, ArF excimer laser light or F_2 excimer laser light, wherein, because the absorption of the ArF excimer laser light or F_2 excimer laser light by [oxygens] oxygen or water content is very large, the oxygen concentration or water concentration must be lowered to attain a sufficient transmission factor and a good stability of ultraviolet light. The present invention concerns development of effective purge means in relation to a wafer and/or a reticle, which moves along the path of ultraviolet light inside the exposure apparatus. --

Please substitute the paragraph beginning at page 11, line 5, with the following.

-- The left-hand and right-hand stators 1 and 1' receive a drive reaction force of the force which functions to move the moving unit 3 as a whole, including the movable [element2] element 2. With this drive reaction force, the stators 1 and 1' [displaces] displace along the plane

guide surface 6. Through this motion of the stators 1 and 1' along the plane guide surface 6, the stators 1 and 1' can function as a reaction force counter. In this embodiment, if, for example, the moving unit 3 as a whole moves in the positive (+) Y direction, the stators 1 and 1' receive a drive reaction force in the negative (-) Y direction and thus they shift in the negative Y direction. --

Please substitute the paragraph beginning at page 13, line 7, with the following.

-- Further, in accordance with this embodiment, the left-hand and right-hand stators 1 and 1' are provided independently from each other. As a result, even if the left-hand and right-hand electromagnetic actuators produce different outputs, these stators are moved separately to cancel the reaction force. The left-hand and right-hand actuators may produce such different outputs, for example, in a case where the moving member should be rotationally moved in a θ direction, or a case where an article placed on the moving member has a biased load with respect to the X direction, for example. --

Please substitute the paragraph beginning at page 13, line 19, and ending on page 14, line 4, with the following.

-- Although this embodiment has been described with reference to an example wherein the electromagnetic actuator moves the moving member in the Y direction, the present invention is not limited to this. For example, the moving member may be moved in the X and Y directions.

[In] On that occasion, the electromagnetic actuator may preferably comprise a mechanism for producing a driving force in the X and Y directions and applying the same to the moving member. Also, [in] on that occasion, the stators 1 and 1' may be supported by the static bearing 9 with respect to the plane guide surface 6, and movably in the X and Y directions. --

Please substitute the paragraph beginning at page 21, line 4, with the following.

-- In this embodiment, for the stators 1 and 1', two Y-axis position controlling linear motors 14 are provided on an external structure 23, and they function to push back the stators 1 and 1' as they [moved] move in the Y-axis direction by an amount larger than a predetermined amount. Similarly, for the stators 1 and 1', there are four X-axis position controlling linear motors 15 which are mounted on the external structure 23, to push back the stators 1 and 1' as they [moved] move in the [X axis] X-axis direction by an amount greater than a predetermined amount. --

Please substitute the paragraph beginning at page 22, line 13, and ending on page 23, line 15, with the following.

-- In Figures 4A and 4B, a top plate 5 is provided with a wafer chuck 30 and a position measuring bar 50. The wafer chuck 30 serves to vacuum attract a wafer (the subject to be positioned) and hold the same. Bar mirrors 50 and 51 reflect measurement light from a laser interferometer, not shown. The top plate 5 is floated from and X-Y slider 38, by means of a self-weight compensator (not shown) using a magnet, without contact to the slider, and it has a

freedom with respect to six-axis directions. Further, the top plate 5 can be minutely driven in six-axis directions (X, Y, and Z directions as well as rotational directions about them), by means of an actuator for producing a driving force between the top plate 5 and the X-Y slider 38. The six-axis fine motion actuator comprises two linear motors in the X direction, one linear motor in the Y direction, and three linear motors in the Z direction. [Where] When the two X-direction fine motion linear motors are driven in opposite directions, the top plate can be moved about the [Z axis] Z-axis (i.e., in the θ direction). Thus, by adjusting the driving forces of the three Z-direction fine motion linear motors, the top plate can be moved about the [X axis] X-axis (wX direction) and about the [Y axis] Y-axis (wY axis direction), respectively. Further, the coil which serves as a stator of the fine-motion linear motor is provided at the X-Y slider 38 side, while the permanent magnet which serves as a movable element of the fine-motion linear motor is provided at the top plate side. --

Please substitute the paragraph beginning at page 23, line 25, and ending on page 24, line 10, with the following.

-- Adjacent to the opposite ends of the X-guide bar 28 and the Y guide bar 29, there are movable elements (magnets) 26 and 27 of the linear motors. In response to the flow of electric [currents] current to the two X and Y linear motor stators (coils), a Lorentz force is produced, such that the X guide bar 28 can be moved in the Y direction while the [Y guide] Y guide bar 29 can be moved in the X direction. The linear motor stators (coils) 24 and 25 are guided along the top surface of the reference structure 4, by means of an air bearing (static pressure bearing),

with respect to the Z direction, and they have a freedom with respect to the X and Y directions (along a plane). --

Please substitute the paragraph beginning at page 24, line 11, and ending on page 25, line 7, with the following.

-- Now, the motion of the X-Y slider 38 in the X direction will be explained. When the Y guide bar is moved in the X direction by the Lorentz force described above, a force in the X direction is applied to the X-Y slider 38 through the static bearing 35. Here, the X-Y slider and the Y guide bar will be called an X movable unit. [Where] When the X movable unit is accelerated or decelerated, a reaction force thereof is applied to the X linear motor stator 25. Since the X linear motor stator 25 is supported by the static bearing 34, movably in the X and Y directions, due to this reaction force, the X linear motor stator 25 moves in the X direction. The acceleration and speed of the motion is determined by the ratio between the mass of the X linear motor stator 25 and the mass of the X movable unit. For example, if the mass of the X linear motor stator 25 is 200 Kg per each while the mass of the X movable unit is 40 Kg, the ratio of the mass is 10:1. Therefore, both the acceleration and speed of the X linear motor 21 is one-tenth (1/10) of the X movable unit. In this manner, through the motion of the X linear motor stator 25 in the X direction, in the reference structure, no X-direction reaction force is applied to the X linear motor stator 25. --

Please substitute the paragraph beginning at page 26, line 10, and ending on page 27, line 7, with the following.

In this embodiment, since the X-Y slider is movable in the X and Y directions, the driving force to be produced by the linear motor is different in accordance with the position of the X-Y slider. For example, if in Figure 4A the X-Y slider 38 moves in the positive (+) Y direction and thereafter it moves in the positive (+) X direction, since the X-Y slider as it moves in the positive X direction is on the side close to the positive Y direction, only the driving force as produced by the upper X linear motor, as viewed in the drawing, is larger than the driving force of the lower X linear motor, as viewed in the drawing. This is because, if [in] on such an occasion the outputs of these X linear motors are the same, a moment in the θ direction will be applied to the X-Y slider 38. If the stators are connected to each other into an integral structure, depending on the position of the X-Y slider, a moment in the θ direction may be applied when the drive reaction force is being canceled. In this embodiment, even if the driving forces of the linear motors are different, since the linear motor stators are supported independently from the reference structure, while being movable in the X and Y directions, each stator can function to cancel the drive reaction force, independently of each other. --

Please substitute the paragraph beginning at page 28, line 20, with the following. -- The exposure light may be ultraviolet light such as from a fluorine excimer laser, an ArF excimer laser and a KrF excimer laser, for example. --

Please substitute the paragraph beginning at page 29, line 5, and ending on page 30, line 3, with the following.

-- [Where] When the electromagnetic actuator comprises a linear motor having a movable element and a stator, the movable element and the stator may have [an] a telescopic structure such as shown in Figure 6A or an open structure such as shown in Figure 6B. In Figures 6A and 6B, there are electromagnetic actuators each having a movable element 2 and left-hand and right-hand stators 1 and 1', being separated and independent from each other. Here, the left-hand and right-hand stators 1 and 1' function also as a reaction force counter having a predetermined weight. They are movable along the plane guide surface 6 on the reference structure 4. In the case of a telescopic structure such as shown in Figure 6A, the stators 1 and 1' are supported at the opposite ends of the straight direction. At the opposite ends, they can move freely along the plane guide surface 6 of the straight direction. At the opposite ends, they can move freely along the plane guide surface 6 of the reference structure 4. The movable element 2 is connected to a moving unit 3 being movable in parallel to the plane guide surface by the moving element 2. A top plate 5, for example, may be provided on the movable unit 3, so that an article to be moved can be placed there. On the other hand, [where] when an open structure such as shown in Figure 6B is used, the structure and function will be the same as has been described with reference to the first embodiment. --

Please substitute the paragraph beginning at page 30, line 4, with the following.

-- Ordinary moving systems, X-Y stages and exposure apparatuses may use any one of the telescopic structure and the open structure. However, as described, in an exposure apparatus using ultraviolet light as the exposure light, [oxygen] oxygen and water content along the path of ultraviolet light must be purged completely. --

Please substitute the paragraph beginning at page 30, line 11, with the following.

-- Figures 7A and 7B [shows] show an exposure apparatus according to an embodiment of the present invention, in which the relationship between a stator and a movable element of a linear motor in an X-Y stage is based on an open structure, to a telescopic structure. There is a shielding wall provided inside the stator, and it extends from an illumination optical system to an end face of a substrate structure which serves also as a projection optical system, including a movable unit on which a reticle is placed. The inside space of this wall is purged by using an inactive gas. --

Please substitute the paragraph beginning at page 31, line 20, and ending on page 32, line 4, with the following.

-- As shown in Figure 7B, there is a shielding wall 53 for covering the movable element 2, the movable element 3, the top plate 5, the reticle 52 as well as the mirrors, bar mirrors and detectors which constitute an interferometer. The shielding wall 53 extends from the illumination optical system 54 to an end face of a substrate structure, which functions also as the projection optical system 55. Particularly, the stators 1 and [1 'have] 1' have an open structure,

not a telescopic structure. The inside space of the shielding wall is purged by an inactive gas, against impurities. --

Please substitute the paragraph beginning at page 32, line 5, with the following.

-- In this manner, the relation between the stator and the movable element of the linear motor for the stage is based on an open type structure, and a shielding wall is provided between the stator and the movable element. Also, the inside space is purged against impurities, by using an inactive gas. As a result, even if fluorine laser light is used, the transmission factor is not attenuated by oxygen or water, and a good stability of it is assured[.,]. Further, the purge space around a reticle can be made compact, and the replacing time of inactive gas can be made short. Moreover, because the stator is outside the purge space, it is not influenced by degassing from the stator. --

Please substitute the paragraph beginning at page 32, line 19, with the following.

-- While this embodiment has been described with reference to a one-axis drive reticle stage, the reticle stage may be made movable in the X-axis direction about a movable element, thereby to provide an X-Y stage. Further, a θ -Z tilt stage may be mounted to provide a six-axis movable wafer stage. --

Please substitute the paragraph beginning at page 32, line 27, and ending on page 33, line 10, with the following.

-- Next, an embodiment of a manufacturing system for manufacturing semiconductor devices such as semiconductor chips (e.g., IC or LSI), liquid crystal panels, CCDs, thin film magnetic heads, or micro-machines, for example, will be described. This system is arranged so that repair of any disorder occurring in a production machine placed in a semiconductor manufacturing factory or periodic maintenance thereof or, alternatively, maintenance services such as software supply, can be made by use of a computer network outside the manufacturing factory. --

Please substitute the paragraph beginning at page 33, line 11, and ending on page 34, line 5, with the following.

-- Figure 8 is a schematic view of a general structure of the production system, in a certain aspect thereof. Denoted in the drawing at 101 is a business office of a vendor (machine supplying maker) for providing semiconductor device manufacturing apparatuses. As examples of such production machines, here, pre-process machines (various lithographic apparatuses such as an exposure apparatus, a resist coating apparatus, an etching apparatus, for example, as well as a heat treatment apparatus, a film forming apparatus, and a flattening apparatus) and post-process machines (an assembling machine and an inspection machine, for example) are assumed. Inside the business office 101, there are a host control system 108 for providing a maintenance database for the production machines, plural operating terminal computers 110, and a local area network (LAN) 109 for connecting them to constitute an intranet. The host control system 108 is

provided with a gateway for connecting the LAN 109 to an internet 105 which is an outside network of the office, and a security function for restricting the access from the outside. --

Please substitute the paragraph beginning at page 34, line 6, and ending on page 35, line 22, with the following.

-- On the other hand, denoted at 102 - 104 are plural manufacturing factories of a semiconductor manufacturer or manufacturers as a user (users) of production machines. The factories 102 - 104 may be those which belong to different manufacturers or to the same manufacturer (e.g., they may be a pre-process factory and a post-process factory). In each of the factories 102 - 104, there are production machines 106, a local area network (LAN) 111 for connecting them to constitute an intranet, and a host control system 107 as a monitoring system for monitoring the state of operation of the production machines 106. The host control system 107 in each factory 102 - 104 is provided with a gateway for connecting the LAN 111 in the factory to the internet 105 which is an outside network of the factory. With this structure, the host control system 108 of the vendor 101 can be accessed from the LAN 111 in each factory, through the internet 105. Further, due to the security function of the host control system 108, only admitted users can gain access thereto. More specifically, through the internet 105, status information representing the state of operation of the production machines 106 (for example, the state of the machine in which any disorder has occurred) may be transmitted as a notice from the factory to the vendor. Additionally, any response information which is responsive to the notice (that is, for example, information on how the disorder should be treated or software data

concerning the treatment) as well as a latest software program and maintenance information such as help information, may be supplied from the vendor. The data communication between each factory 102 - 104 and the vendor 101 as well as the data communication through the LAN 111 in each factory, may use a communication protocol (TCP/IP) generally used in the internet. In the place of using the internet, an exclusive line network (e.g., ISDN) controlled with [a] strictest security that [an] access [of] by a third party is not allowed, may be used. Further, the host control system is not limited to the system as provided by the vendor. A database may be structured by the user and it may be set in an outside network, such that is can be accessed from plural user factories. --

Please substitute the paragraph beginning at page 37, line 23, and ending on page 38, line 25, with the following.

-- Each of the production machines in the factory may have a display, a network interface and a computer for executing network accessing [softwares] software, stored in a storage device, as well as machine operating [softwares] software. The storage device may be an internal memory or a hard disk or, alternatively, it may be a network file server. The network accessing [softwares] software may include an exclusive or wide-use web browser, and [an] a user screen interface such as shown in Figure 10, for example, may be provided on the display. Various data may be inputted into the computer (input zones on the screen) by an operator who controls the production machines in each factory, such as, for example, machine type (401), serial number (402), trouble file name (403), date of disorder (404), emergency level (405), status (406),

solution or treatment (407), and progress (408). The thus inputted information is transmitted to the maintenance database through the internet. In response, appropriate maintenance information is replied from the maintenance database to the user's display. Further, the user interface as provided by the web browser enables a hyperlink function (410 - 412) as illustrated. As a result, the operator can access further details of information in each [items] item, or he/she can get a latest version software to be used for the production machine, from the software library as provided by the vendor. Alternatively, the operator can get an operation guide (help information) prepared for factory operators. --

Please substitute the paragraph beginning at page 39, line 2, with the following.

-- Figure 12 is a flow chart of a general procedure for the manufacture of microdevices. --

Please substitute the paragraph beginning at page 39, line 4, with the following.

-- Step 1 is a design process for designing a circuit of a semiconductor device. Step 2 is a process for making a mask on the basis of the circuit pattern design. Step 3 is a process for preparing a wafer by using a material such as silicon. Step 4 is a wafer process (called a pre-process) wherein, by using the so prepared mask and wafer, circuits are practically formed on the wafer through lithography. Step 5 subsequent to this is an assembling step (called a post-process) wherein the wafer having been processed by step 4 is formed into semiconductor chips. This step includes an assembling (dicing and bonding) process and a packaging (chip sealing) process. Step 6 is an inspection step wherein an operation check, a durability check and so on for

the semiconductor devices provided by step 5 are carried out. With these processes, semiconductor devices are completed and they are shipped (step 7). --

Please substitute the paragraph beginning at page 41, line 4, with the following.

-- In a moving system and a stage according to the present invention, a reaction force during acceleration or deceleration as a movable portion moves is received by a stator. The stator having the reaction force received moves, by which the reaction force is converted into a kinetic energy of the stator, whereby the stator functions as a reaction force counter. With this structure, vibration of the machine reference structure produced by the reaction force of the moving system or the stage can be prevented. Also, since the two stators move along the machine reference structure, in accordance with the acceleration of the moving element, any biased load as the moving element moves can be made small. --

Please substitute the paragraph beginning at page 41, line 18, and ending on page 42, line 4, with the following.

-- In accordance with an exposure apparatus having a stage described above, the influence of vibration or swinging motion resulting from the motion of the stage can be reduced, such that the overlay precision, the linewidth precision, and the throughput can be improved. Further, since the biased load as the moving element moves can be made smaller, the overlay precision can be improved. Further, because the influence of the reaction force, due to the acceleration or deceleration of the stage, can be reduced, the influence to the other machines placed on the same

floor, can be made smaller. Also, enlargement of the area to be occupied by the apparatus can be prevented. --

IN THE CLAIMS

1. (Amended) A moving mechanism, comprising:

a reference structure having a guide surface;

a movable portion being movable along the guide surface; and

an actuator having [a movable element disposed at the movable portion side]

movable elements, provided at opposite end portions of the stage, and at least two stators, said stators being separated from each other and each being [moved] movable in two-dimensional directions by a reaction force produced as the movable portion is driven.

3. (Amended) A moving mechanism according to Claim 1, wherein said stators are movable in the two-dimensional [direction] directions along the guide surface.

8. (Amended) A stage having a moving mechanism as recited in Claim 1, and having a position measuring device and a driving mechanism for positioning [a] the movable portion.

11. (Amended) An exposure apparatus, comprising:

exposure means for projecting a portion of a circuit pattern on a substrate through a projection optical system, and for printing a predetermined exposure region of the pattern of [the] an original [on] onto the substrate; and

a stage as recited in Claim 8, for moving at least one of the original and[/or] the substrate for exposure thereof.

12. (Amended) An apparatus according to Claim 11, wherein the exposure is performed by scanning exposure in which the original and the substrate are scanningly moved [relatively] relative to the projection optical system, whereby a predetermined exposure region of the pattern of the original is scanningly printed on the substrate, and wherein, for the scan, at least one of the original and[/or] the substrate is moved by said stage.

16. (Amended) An apparatus according to Claim 15, wherein the laser light is from a fluorine excimer laser.

17. (Amended) An apparatus according to Claim 15, wherein the laser light is from an ArF excimer laser.

18. (Amended) An apparatus according to Claim 11, wherein, in said stage, the relation between a stator and a movable element of a linear motor is based on an open structure, and wherein a shielding wall is provided inside the stator, said shielding wall extending from at least

one of an illumination optical system and[/or] a projection optical system to the substrate structure, while enclosing a movable portion having the movable element, the inside space being purged by use of an inactive gas.

20. (Amended) An apparatus according to Claim 19, wherein the interferometer includes a reaction force counter and the reaction force counter is supported by an actuator for producing a thrust in a straight direction, and wherein a drive reaction force in the straight direction is received by a reaction force receiving structure being supported by the floor, separately from the stage base.

21. (Amended) A device manufacturing method, comprising the steps of:

providing a group of production machines for performing various processes, including an exposure apparatus as recited in Claim 11, in a semiconductor manufacturing factory; and

producing a semiconductor device [through] by performing plural processes using the production machine group.

24. (Amended) A semiconductor manufacturing factory, comprising:

a group of production machines, for performing various processes, including an exposure apparatus as recited in any one of Claims 11 - 20;

a local area network for connecting the production machines of the production machine group with each other; and

a gateway for enabling [an] access from the local area network to an external network outside the factory[;],

wherein information related to at least one production machine in the group can be data communicated by use of the local area network and the gateway.

25. (Amended) A method of executing maintenance for an exposure apparatus as recited in any one of Claims 11 - 20, provided in a semiconductor manufacturing factory, said method comprising the steps of:

[preparing] providing, by a vendor or a user of the exposure apparatus, a maintenance database connected to an external network outside the semiconductor manufacturing factory;

admitting [an] access from the semiconductor manufacturing factory to the maintenance database through the external network; and

transmitting maintenance information stored in the maintenance database to the semiconductor manufacturing factory through the external network.

26. (Amended) An apparatus according to Claim 11, further comprising a display, a network interface and a computer for executing [a] network software, wherein maintenance

information related to said exposure apparatus is data communicated through the computer network.

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